

***Oenothera harringtonii* Wagner, Stockhouse & Klein (Colorado Springs evening-primrose)**

Species Conservation Assessment Update

Title of Assessment: *Oenothera harringtonii* Wagner, Stockhouse & Klein (Colorado Springs evening-primrose): A Technical Conservation Assessment, USDA Forest Service, Rocky Mountain Region

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Update Summary: New occurrences of *Oenothera harringtonii* have been documented since data was obtained for the original assessment, and previously known occurrences have been updated by more recent observation. The number of observed individuals has doubled but this does not represent a significant change in the known range or distribution. Several land use planning projects have the potential to contribute to the conservation of the species. The proposed expansion of the Pinyon Canyon Maneuver Site has the potential to have the greatest detrimental effects on the species in the near future.

Distribution: New Information Provided

References: New References Provided

Taxonomic Status: Unchanged

Agency Status: Unchanged

Other: See Below

Significance of Changes Relative to Original Assessment: The list of known occurrences has been augmented, and the total population number is now larger than that presented in the original assessment. However, the conservation status of the species has not changed. Moreover, land use changes and planning efforts that could greatly help or hurt the persistence of the species are currently ongoing, with many issues yet to be resolved. Therefore, a complete revision of the assessment is not warranted at this time.

Positive Findings of New or Updated Information and Their Sources

(Note: The Table A checklist attached to this update provides a summary of all sources consulted)

Source 1

NatureServe. 2004. Species at risk on Department of Defense installations, revised report and documentation. Report submitted to Department of Defense and US Fish and Wildlife Service. NatureServe, Arlington, VA. Available online: https://www.denix.osd.mil/denix/Public/Library/NCR/Documents/DOD_SAR_report_FINAL.pdf

and

Anderson, D.G. 2006. Personal communication with Colorado Natural Heritage Program Botanist.

Summary of New Information

Oenothera harringtonii has been recognized as a species at risk on a DoD installation, Pinon Canyon Maneuver Site in southeastern Colorado. In May of 2006, the proposed expansion of this

installation became public. Although the details have yet to be worked out, information available at the time of this review indicates that the proposed expansion could add over 400,000 acres to the existing 235,000 acre site. There are currently two documented occurrences on PCMS land. The DoD's poorly defined "area of interest" around the existing extent could include a dozen or more additional *O. harringtonii* occurrences. There is a potential for military training exercises to become a significant threat to the species. Survey work by CNHP during 2006 included this species at PCMS (see Source 5).

Relevant Sections of the Conservation Assessment Affected by the Updates

Status, Management Status, Existing Regulatory Mechanisms, Threats, Conservation Status, Implications and Potential Conservation Elements

Source 2

Grunau, L., A.K. Ruggles, M. Venner, C. Pageu, R. Rondeau, and J.M. Powell. 2003. Programmatic biological assessment, conference report, and conservation strategy for impacts from transportation improvement projects on select sensitive species on Colorado's central shortgrass prairie. Unpublished report prepared for USFWS by Colorado Natural Heritage Program, Bear Canyon Consulting Group, Venner Consulting, The Nature Conservancy, and the Colorado Department of Transportation.

U.S. Fish and Wildlife Service. No date. Central Shortgrass Prairie, Programmatic Biological Opinion. Available online: www.dot.state.co.us/environmental/Wildlife/SGPIBO.pdf

Summary of New Information

Oenothera harringtonii was included as a species of concern in the Conservation Strategy for Non-listed Species adopted by the Colorado Department of Transportation (Grunau et al. 2003) as part of its planning for routine maintenance and upgrade activities on existing transportation corridors of eastern Colorado (see page 7, original assessment). This strategy is intended to minimize and compensate for impacts from transportation improvement projects on Colorado's central shortgrass prairie. The strategy includes the following Best Management Practices (USFWS no date) to be employed within areas of presumed presence of *O. harringtonii*.

- If target plant(s) are present, mowing will be avoided until late in the season (mid-September) if possible. The timing of these efforts is important because flowering does not occur until mid-summer, and therefore, seeds are not fully developed until fall. If mowing cannot wait until autumn (e.g., for safety reasons), spring mowing (prior to June 15) will still allow plants to complete their reproductive life cycle.
- Re-seeding of disturbed areas will be with a mix of native graminoids and forbs wherever possible. Native mixes shall be specified and/or approved by the CDOT landscape architect.
- Herbicide applications will be used only if the herbicide targets monocots but not dicots. If monocot targeted herbicides are used, timing of application is not an issue.
- Where road widening results in alteration of the hydrologic regime, efforts will be made to ensure that water flow is not interrupted.

Relevant Sections of the Conservation Assessment Affected by the Updates

Threats, Implications and Potential Conservation Elements, Tools and practices

Source 3

US Forest Service. 2005. Draft Cimarron and Comanche National Grasslands Land Management Plan (and other forest plan revision documents). Available online: http://www.fs.fed.us/r2/psicc/projects/forest_revision/plan_documents.shtml

Summary of New Information

The draft of the revised Land Management Plan for the Cimmaron and Comanche National Grasslands was published in December 2005. *Oenothera harringtonii* is included as a proposed species of concern.

Relevant Sections of the Conservation Assessment Affected by the Updates

Status, Management Status, Existing Regulatory Mechanisms

Source 4

Colorado Natural Heritage Program. 2006. Biodiversity Tracking and Conservation System (BIOTICS). Colorado State University, Fort Collins, CO.

and

University of Colorado Herbarium. 2006. Specimen database of Colorado vascular plants. Available online: <http://cumuseum.colorado.edu/Research/Botany/Databases/search.php>

and

Olson, S. 2006. Personal communication with Botanist, Pike and San Isabel National Forests, Comanche and Cimarron National Grasslands.

Summary of New Information

Comparison of Table 1 in the original assessment with data available in the CNHP database as of June 2006 revealed several discrepancies. The original assessment did not include two occurrence records that would have been available in the 2002 version of data. These may have been disregarded because of the low number of individuals. Twelve additional occurrences have been documented and seven previously known occurrences have been updated since the assessment was written. In addition, one occurrence that was reported by the author as observed in 1998 was in fact not found during that survey. Changes and corrections (highlighted in yellow) have been added to a revised version of Table 1 below. Information from the University of Colorado Herbarium specimen database, and from Steve Olson has also been incorporated. Although these additions increase the number of documented occurrences, they do not substantially change the overall distribution of the species, and do not indicate a range expansion. These recent observations have added between 800-1000 plants to the total number of individuals that may be extant. Only one of the new occurrences is not on privately owned land (EO 35). There is no change in the habitat or protection status of the species.

Relevant Sections of the Conservation Assessment Affected by the Updates

Distribution and abundance

CNHP EO#	Author number	County	Location	Dates Observed	Source
--	1	Alamosa	Wash Springs, San Luis Valley.	July 1897	<i>E. Bethel s.n.</i> CS
5	2	El Paso	Colorado Springs.	May 29, 1939	<i>J.H. Ehlers 7461</i> NY (Isotype)
--	3	El Paso	19 miles outside of Colorado Springs on Highway 115.	May 10, 1969	<i>R. Simpson s.n. with S. Gardner</i> COLO
15	4	Fremont	1988: Blue Heron Property - BLM (Brekke personal communication). 2001: Steep slopes above Route 115 just northeast of Arkansas River crossing. 2003: Along Highway 120. Occurrence distributed over two sections.	May 29, 1998; July 22, 2001; June 4, 2002 May 21, 2003	<i>S. Spackman SS0106A</i> 2001 COLO. Colorado Natural Heritage Program (2002, 2006). Author's observation 2003
17	5	Fremont	1970: At junction of Highways 115 and 50. 1995: Penrose. Intersection of Highways 115 and US 50. 1999: US 50 and COLO 115.	May 22, 1970; June 3, 1995; June 16, 1999	<i>D. Duba 15</i> 1970 COLO. <i>C. Crawford s.n.</i> 1995. COLO. <i>C.L. Crawford s.n.</i> 1999
22	6	Fremont	North of Highway 50, near the Gold Belt National Back County Byway.	June 14, 2000	Colorado Natural Heritage Program (2002)
9	7	Fremont	15 miles northeast of Cañon City.	May 28, 1954	<i>H. Harrington 7302</i> CS
8	8	Fremont	0.5 miles south of Florence on Highway 67.	July 2, 1967	<i>R. Goeken 18</i> CS (triplicate specimens)
1	9	Fremont	1942: Arkansas River Canyon, 2 miles east of Concrete, near Pueblo County line. 1998: search along Highway 150 in general vicinity of 1942 site.	June 12, 1942 1998	<i>J.A. Ewan 14195</i> 1942 COLO. 1998 survey in Colorado Natural Heritage Program (2002), searched but not found
33	--	Fremont	East of federal prison	May 28, 1999	<i>B. Elliot 6192</i> RM
34	--	Fremont / Pueblo	Dry bank on road between Highway 115 and Stone City.	May 30, 1949	<i>J. Hartwell 2128</i> CC
10	10	Huerfano	About 8 miles south of Walsenburg, on west service road for I-25, 0.8 mile north of exit 42 (Pryor Exit).	May 26, 1995 June 5, 2003	<i>W.F. Jennings 95-18 with R.E. Jennings</i> COLO Colorado Natural Heritage Program (2006)
31	--	Huerfano	Interstate 25, exit 42	June 4, 1998	<i>B. Elliot 955</i> RM
30	11	Las Animas	1993: Hwy I-25, near Exit 41, 29 miles N of Trinidad, on steep clay road cuts.	June 13, 1993; 1995; May 26, 1998	<i>Weber 18665 with Wittmann</i> 1993 COLO (duplicate specimens). Colorado Natural Heritage Program (2002)
12	12	Las Animas	Approximately 1.5 miles west-northwest of Branson within 2 miles of the Colorado-New Mexico State line. Approximately 3 miles east-southeast of Walts Corner.	May 27, 1998	Colorado Natural Heritage Program (2002)
19	13	Las Animas	Pinyon Canyon Maneuver Site, 3 miles north of Rd 2, NW of Joela Windmill.	May 28, 1997 June 12, 2004	<i>T. Kelso 97-42</i> COLO Colorado Natural Heritage Program (2006)
32	14	Las Animas	Near road leading to ranch west of Trinchera, 1 mile from New Mexico-Colorado border.	June 11, 1968	<i>R. Walter 1452</i> CS
13	15	Las Animas	Along US 160, 3 miles northwest of western end of Mesa de Maya.	May 19, 1948 May 27, 1998	<i>C.M. Rogers 5751</i> Colorado Natural Heritage Program (2006)

CNHP EO#	Author number	County	Location	Dates Observed	Source
11	--	Las Animas	South of 160 on 113	May 27, 1998	Colorado Natural Heritage Program (2006)
14	--	Las Animas	East of Trinidad on 160, 1.6 miles east of road 1470	May 27, 1998	Colorado Natural Heritage Program (2006)
35	--	Las Animas	Pinyon Canyon Manuver Site	May 12, 2004	Colorado Natural Heritage Program (2006)
36	--	Las Animas	Edge of Apishipa Wildlife Area	June 2, 2004	<i>T. Kelso 04-28. With G. Maentz</i> COLO
38	--	Las Animas	South of Highway 160, west of Mooney Hills	May 29, 1997	Colorado Natural Heritage Program (2006)
39	--	Las Animas	Highway 160, west of San Francisco Creek	May 29, 1997	Colorado Natural Heritage Program (2006)
37	--	Las Animas (Otero)	Vicinity of Timpas, west/southwest of CO 350 all along County Road 88	May 12, 2004	<i>T. Kelso 04-17. With G. Maentz</i> COLO
20	16	Otero	North of David Canyon Road.	June 2, 1995 2005	<i>D.L. Hazlett 9471</i> COLO. Hazlett (1997). Colorado Natural Heritage Program (2002) Olsen (2006)
21	17	Otero	North of Bloom within 0.5 km of the border of the USDA Forest Service Comanche Grassland.	May 24, 1997	Colorado Natural Heritage Program (2002)
7	18	Otero	Rocky Ford, bank of Arkansas River.	June 13, 1891	<i>C. Crandall s.n.</i> 1981 CS
2	19	Otero	Cedar mesas, 25 miles south of La Junta.	June 12, 1936	<i>L. Paull 9</i> COLO
24	20	Pueblo	West of Bragdon.	May 21, 1995	<i>R. Hartman and T. Chumley 50265</i> 1995 RM
4	21	Pueblo	In town of Pueblo, east of junction between I 25 and Highway 50.	1897; June 03, 1931	<i>A. Nelson 11527</i> 1931 COLO in Colorado Natural Heritage Program (2002)
4	22	Pueblo	Pueblo.	July 1897; 1908	<i>E. Bethel s.n.</i> 1897 COLO. W.W. Robbins 5022 1908 COLO
23	23	Pueblo	Pueblo West, south of Highway 50.	July 17, 2001 May 13, 2003	Colorado Natural Heritage Program (2002) Colorado Natural Heritage Program (2006)
16	24	Pueblo	Just west of Pumpkin Hollow.	June 3, 1998; May 31, 2001	Colorado Natural Heritage Program (2002)
25	25	Pueblo	North of Pueblo Reservoir.	July 19, 2001 June 12, 2003	Colorado Natural Heritage Program (2002) Colorado Natural Heritage Program (2006)
26	--	Pueblo	Junction Hwy 47 and Baculite Mesa Road	May 27, 1999	<i>B. Elliot 6132</i> RM, COLO
27	--	Pueblo	Little Burnt Mill Road	May 21, 1998	<i>B. Elliot 5873</i> RM
28	--	Pueblo	Burnt Mill Road, 5 mi. east of Crow Cutoff	June 13, 1998	<i>B. Elliot 1786</i> RM
29	--	Pueblo	PSWA fishermans access road	June 12, 2003	Colorado Natural Heritage Program (2006)

Source 5

Anderson, D.G. 2006. Personal communication with Colorado Natural Heritage Program Botanist.

Summary of New Information

Oenothera harringtonii was a target species in two CNHP projects during 2006. Ongoing rare plant surveys of Fort Carson Military Reservation and Pinon Canyon Maneuver Site, and a rare plant field survey of the Arkansas Canyon in conjunction with the Bureau of Land Management and the Colorado Natural Areas Program may result in additional discoveries of this species.

Relevant Sections of the Conservation Assessment Affected by the Updates

Additional research and data resources

Additional Unabstracted Sources – *pre*-Assessment

(citations pre-dating Assessment publication that were not referenced in it).

None.

Additional Unabstracted Sources – *post*-Assessment

(citations post-dating Assessment publication that refer to the target genus but were determined by the reviewer to contain no information requiring an update of the original assessment)

The following references are of interest in the biology and taxonomy of *Oenothera* species:

Evans M.E.K., D.J. Hearn, W.J. Hahn, J.M. Spangle, and D.L. Venable. 2005. Climate and life-history evolution in evening primroses (*Oenothera*, Onagraceae): A phylogenetic comparative analysis. *Evolution* 59: 1914-1927.

Levin RA, WL Wagner, PC Hoch, WJ Hahn, A Rodriguez, DA Baum, L Katinas, EA Zimmer, KJ Sytsma. 2004. Paraphyly in tribe onagreae: Insights into phylogenetic relationships of Onagraceae based on nuclear and chloroplast sequence data. *Systematic Botany* 29:147-164.

Litus, G. 2004. The effects of water limitation and heat on flower production, resource allocation and partial style abscission in *Oenothera macrocarpa* ssp. *incana*. M.S. thesis, Colorado State University, Fort Collins, Colorado.

Metcalf JC, Rose KE, Rees M. 2003. Evolutionary demography of monocarpic perennials. *Trends in Ecology & Evolution* 18:471-480.

Raguso, R.A. 2004. Why are some floral nectars scented? *Ecology* 85: 1486-1494.

Thomson D. 2005. Measuring the effects of invasive species on the demography of a rare endemic plant. *Ecological invasions* 7:615-624.

Wagner, W.L. 2005. Systematics of *Oenothera* Sections *Contortae*, *Eremia*, and *Ravenia* (Onagraceae). *Systematic Botany* 30:332-355.

Checklist of Sources Consulted for Updates to *Oenothera harringtonii* Conservation Assessment

Guidelines for Producing Updates

Sources of information relevant to review of this Technical Conservation Assessment for updates include databases, experts, personal communications, published and unpublished literature. Positive results are discussed in detail in the Summary of Addendum to the Technical Conservation Assessment.

Internet Literature Searches: The minimal search for each update consisted of Google Scholar, Federal Register, plus a minimum of three other available online literature databases. Search terms included at a minimum: species common name, genus, and recent synonyms. Other keywords were used at the discretion of the reviewer. Searches were constrained to the time beginning two years prior to publication of the Technical Conservation Assessment to the present.

Two attempts were made to contact experts and agency personnel.

Search terms used included: “*Oenothera*”, “*Oenothera harringtonii*”, “Colorado Springs evening primrose”, “Arkansas Valley evening primrose”.

Table A. Sources of information consulted for updates to the Species Conservation Assessment.

Source Category	Source/ Name	Date	Results
Announcement from R2 to all FS personnel (including species list)			No announcement was made
Internet based literature databases	Google	06/07/06	New information, see reference 1, 2
	Google Scholar	06/07/06	New information, see reference 3
	Google Book Search	06/07/06	No new sources
	Federal Register	5/28/2006	No new information
	CSU Library Catalog	5/28/2006	No new sources
	Prospector (searches multiple university libraries in Colorado)	5/28/2006	No new sources
	Web of Science	06/07/06	New information, see unabstracted references
	Agricola	06/07/06	No new sources not already found by other searches
	Biological Abstracts	06/07/06	No new sources not already found by other searches
	WorldCat Dissertations and Theses Database	06/07/06	No new sources
NatureServe affiliate program databases and personnel	Colorado Natural Heritage Program BIOTICS database, staff botanists	5/10/06 6/7/06	New information- see reference 1, 4, 5
State Agency Personnel	Brian Kurzel Colorado Natural Areas Program Brian.Kurzel@state.co.us	06/07/06	No new information
Federal Agency Personnel	Steve Olson PSICC Botanist	5/11/2006	New information, see reference 4
Primary experts	Warren L. Wagner Smithsonian Institution National Museum of Natural History Department of Botany, MRC 166 PO Box 37012 Washington DC 20013-7012 fax: 202-786-2563 email: wagnerw@si.edu	5/11/2006	No new information

Source Category	Source/ Name	Date	Results
	Tass Kelso Colorado College tkelso@ColoradoCollege.edu	6/8/06	No new information
Museums and Herbaria	University of Colorado (COLO)	6/7/06	New specimens, see reference 4
	Colorado State University (CS)	6/7/06	No new specimens
Internal USFS Intranet search		--	Not searched
Original Author	Ladyman, Juanita. JnJ Associates LLC, 6760 South Kit Carson Circle East, Centennial, CO 80122 juanita_ladyman@hotmail.com 303 703 4732	5/18/2006	No new information

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